PROJECT NUMBER: 1758
PROJECT TITLE: Tobacco Cell Wall Research
PROJECT LEADER: G. H. Bokelman
PERIOD COVERED: September, 1988

I. SIDESTREAM REDUCTION (B. Rogers, S. Baldwin, G. Bokelman and S. Tafur)

A. Objectives: (1) Prepare cigarette paper, acceptable both in appearance and porosity, on the pilot-scale paper machine at the University of Maine and (2) continue to prepare handmade cigarettes from cigarette paper handsheets.

B. Results: A quantity of cigarette paper was prepared which was judged to be acceptable in appearance and formation (1). However, we were not able to achieve the desired range of porosity in this cigarette paper, although we did approach it. Further investigations strongly suggested that the flax used for the starting material was too highly purified, having too small a quantity of material referred to as "shives" (2). Depending on processing conditions, the content of these crude fibers can be reduced during the decortication, cooking, and purification of the raw flax. Individual cells, which are usually referred to as fibers, of "shive" contribute to the filling of the sheet and to binding. Consequently, paper prepared without these fibers does not form a tight enough sheet, and is thus too porous. However, it was found that varying refining conditions to produce a mixture of fiber lengths for the residual bast fibers partially compensated for the lack of "shive" cells.

Our best cigarette paper run utilized a fine particle size calcium carbonate (Multiflex MM), a high paper basis weight and the optimum refined fiber mixture determined in earlier runs. Using these conditions, paper with an 11 Coresta porosity was produced.

Numerous handmade cigarettes were prepared from cigarette paper handsheets. A total of nineteen cigarette samples were submitted for single port light extinction measurements. These included cigarettes made from papers with varying particle sizes of $CaCO_3$, different levels of chemical additives (potassium succinate and MAP), bilayer sheets incorporating carbon in the inner layer (both with and without methylcellulose) and $MgCO_3$. In addition, handmade cigarettes were made from a commercial paper. A preliminary evaluation of the resultant data indicated that $MgCO_3$ and high surface area $CaCO_3$ fillers give greater sidestream visibility reductions than would be predicted based on porosity alone.

C. Plans:

1. We will attempt to locate sources of less purified flax, that is, flax containing a greater content of "shive" cells.

2. We will send conventional cigarette paper to Dr. David Kraske at the University of Maine to regenerate the fibers and determine freeness and weight length of the fibers as an indication of refining conditions used.

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3. We will have both the current (Danforth) flax fibers and the regenerated cigarette paper fibers characterized at the University of Maine laboratories so that reasonable raw material specifications can be established.

4. We will process conventional cigarette paper at Philip Morris to produce a regenerated flax stock containing "shive" fibers. This stock will be used for the preparation of handsheets to demonstrate the ability to produce less porous paper. If successful, such regenerated stock may be used on the University of Maine paper machine to prepare a less porous cigarette paper.

D. References:

1. Baldwin, S. D., R. M. Rogers and G. H. Bokelman, memo to R. N. Ferguson, "Preparation of Cigarette Paper on Pilot-Scale Paper Machine," September 22, 1988.

2. Rogers, R. M., Internal Ecusta Corporation Study, June, 1981.

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